

Message Text

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EPA/CCMS:FAHARRIS
ERDA:DHARVEY
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OES/NET:MPROCHNIK (INFO)
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FM SECSTATE WASHDC
TO AMEMBASSY STOCKHOLM
INFO USMISSION OECD PARIS
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E.O. 11652: N/A

TAGS: CCMS, ENRG, NATO

SUBJECT: CCMS: RATIONAL USE OF ENERGY INTERNATIONAL
INDUSTRIAL DATA BASE PROJECT - RECOMMENDA-
TIONS FOR FUTURE WORK

1. REQUEST EMBASSY PASS SUBJECT PROJECT CONCLUSIONS AND
RECOMMENDATIONS TO STAFFAN ULVONAS, NATIONAL SWEDISH
BOARD FOR TECHNICAL DEVELOPMENT, LILJEHOLMSVAGEN 32,
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STOCKHOLM, TEL: (08) 190150. US REPRESENTATIVE TO SWEDISH
NATIONAL TECHNICAL BOARD HOSTED IEA MEETING ON ENERGY
EFFICIENT INDUSTRIAL PROCESSES, TO TAKE PLACE IN STOCKHOLM,
JANUARY 25-28, WOULD LIKE TO CIRCULATE THESE RECOMMENDA-
TIONS TO OTHER PARTICIPATING COUNTRIES FOR THEIR INFORMATION
PRIOR TO MEETING. EMBASSY REQUESTED ASK ULVONAS IF SWEDISH

BOARD WILL CIRCULATE THIS MATERIAL WITH OTHER INFORMATION TO CONFERENCE DELEGATES. IF ULVONAS PREFERS, US DELEGATE WILLING SEND MATERIAL DIRECTLY TO OTHER PARTICIPANTS. PLEASE ADVISE BY JANUARY 5.

2. CEMENT

THIS LIST REPRESENTS A CEMENT-INDUSTRY VIEWPOINT AND DOES NOT CLAIM ANY PRIORITY OVER AND ABOVE R&D WORK IN OTHER INDUSTRIES OR OTHER SECTORS OF THE ECONOMY. THE RECOMMENDED PROJECTS LIST IS:

BLENDED CEMENTS

A. BLENDED-CEMENT PROPERTIES AND LIMITATIONS

GRINDING

B. INFLUENCE OF CEMENT PARTICLE SIZE AND SIZE DISTRIBUTION ON CONCRETE PROPERTIES

C. INFLUENCE OF CLINKER GRINDING AIDS ON CONCRETE PROPERTIES AND STANDARDS FOR GRINDING AIDS

D. INFLUENCE OF RAW-MEAT PARTICLE SIZE AND SIZE DISTRIBUTION ON CEMENT MANUFACTURE

ALKALI TOPICS

E. STUDIES OF THE ALKALI-AGGREGATE REACTION UNCLASSIFIED

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F. USE OF THE PRECALCINER AS A MEANS OF UTILIZING THE FOUR-STAGE PREHEATER IN PRODUCING LOW-ALKALI CEMENT WITH RELATIVELY HIGH-ALKALI RAW MATERIALS

G. FIXATION OF ALKALIS IN KILN DUST

SULFUR TOPICS

H. INFLUENCE OF SULFATE CONTENT ON CLINKER GRINDABILITY

I. SULFATE SPECIFICATIONS AS A CONSTRAINT TO GYPSUM AS AN ADDITIVE

SINCE DIFFERENT PRIORITIES ARE GIVEN TO THE PROJECTS BY DIFFERENT NATIONS, THIS LIST IS NOT ARRANGED IN ANY PARTICULAR ORDER, BUT IS GROUPED BY CATEGORIES FOR THE CONVENIENCE OF DISCUSSIONS.

PROJECT A: BLENDED-CEMENT PROPERTIES AND LIMITATIONS

THE PURPOSE OF THIS PROJECT IS TO PROVIDE COMPREHENSIVE DOCUMENTATION SUPPORTING THE USE OF BLENDED CEMENTS

WHEREVER TECHNICALLY JUSTIFIED AND TO PROVIDE GUIDELINES FOR DETERMINING SITUATIONS IN WHICH THE USE OF BLENDED CEMENTS IS NOT ADVISABLE. IN ADDITION, PRACTICAL RECOMMENDATIONS FOR SPECIFICATIONS OF ADDED MATERIALS (SLAGS, FLY ASH, ETC.) AND FOR BLENDED CEMENTS THEMSELVES WOULD BE DEVELOPED. GUIDELINES FOR BLENDING CEMENTS ON SITE (BY CONSTRUCTION CONTRACTORS, FOR EXAMPLE) WOULD ALSO BE DEVELOPED.

PROBLEMS TO BE FACED WILL INCLUDE THE "TRANSLATION" OF LABORATORY TESTING METHODS FROM COUNTRY TO COUNTRY, AS WELL AS THEIR TRANSLATION TO REAL PRACTICE. THE APPLICA-
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BILITY OF THE AUTOCLAVE TEST FOR SOUNDNESS SHOULD BE CONSIDERED. IN THIS RESPECT THEREFORE THE PROJECT SHOULD INCLUDE A THOROUGH REVIEW OF TEST MEHTODS FOR BLENDED CEMENTS AND THE DEVELOPMENT OF RECOMMENDED METHODOLOGY WHERE APPROPRIATE.

PROJECT B: INFLUENCE OF CEMENT PARTICLE SIZE AND SIZE DISTRIBUTION ON CONCRETE PROPERTIES

THE PURPOSE OF THIS PROJECT IS THEREFORE TO DOCUMENT THE CHARACTERISTICS OF CONCRETE MADE FROM A SELECTION OF TYPICAL ASTM TYPE 1 CEMENTS (OR EQUIVALENT IN EACH COUNTRY) WHICH HAVE BEEN GROUND TO VARIOUS DEGREES OF FINENESS AND TO ESTABLISH THE INFLUENCE OF PARTICLE-SIZE DISTRIBUTION AND CHEMICAL COMPOSITION ON COMPRESSIVE STRENGTH WOULD BE STUDIED EMPIRICALLY, CROSS-CORRELATING THE CHARACTERISTICS OF CEMENTS PRODUCED WITH TEST STRENGTHS MEASURED BY STANDARD TESTS (SUCH AS DIN 1164). TESTING COULD INCLUDE PORTLAND, SLAG, AND POZZOLANIC CEMENTS.

BASED ON THE FINDINGS OF THE FIRST SERIES OF TESTS, A MAJOR PROGRAM OF CONCRETE TESTING SHOULD BE DEVELOPED. THIS WOULD INCLUDE INVESTIGATING SUCH PARAMETERS AS WORKABILITY, WATER REQUIREMENT, SOUNDNESS, AND DURABILITY (E.G., FREEZE-THAW RESISTANCE AND RESISTANCE TO CHEMICAL ATTACK).

PROJECT C: INFLUENCE OF CLINKER GRINDING AIDS ON CONCRETE PROPERTIES AND STANDARDS FOR GRINDING AIDS

THE PURPOSE OF THIS PROJECT IS TO DEVELOP AN UNDERSTANDING OF THE EFFECTS OF COMMONLY AVAILABLE GRINDING AIDS ON CONCRETE PROPERTIES AND TO DEVELOP STANDARDS FOR ASSESSING GRINDING AIDS. DEVELOPING A TEST TO CHECK THE QUANTITY OF A GRINDING AID PRESENT IN CONCRETE IS ALSO A WORTHWHILE TASK. THE QUESTION OF POTENTIAL HEALTH AND ENVIRONMENTAL UNCLASSIFIED

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HAZARDS ASSOCIATED WITH RECOMMENDED CATEGORIES OF CHEMICAL ADDITIVES WOULD BE INCLUDED IN THE EXAMINATION OF EFFECTS OF GRINDING AIDS.

PROJECT D: INFLUENCE OF RAW-MEAL PARTICLE SIZE AND SIZE DISTRIBUTION ON CEMENT MANUFACTURE

THIS PROJECT WOULD PROVIDE QUANTITATIVE INFORMATION ON THE KEY PHYSICAL PARAMETERS FOR CHARACTERIZING CEMENT-PLANT RAW-MATERIAL PARTICLE SIZE AND SIZE DISTRIBUTION. WORK WOULD INCLUDE INVESTIGATING THE RELATIONSHIPS BETWEEN THESE PARAMETERS AND THE CHEMICAL COMPOSITION OF RAW MATERIALS AND THE IMPACT OF VARIATIONS IN SIZE AND SIZE DISTRIBUTION ON KILN OPERATING CONDITIONS AND ON FINAL PRODUCT CHARACTERISTICS. FOLLOWING A THOROUGH LITERATURE SURVEY OF PRIOR WORK ON THIS TOPIC, A SERIES OF TESTS WOULD BE RUN IN THE LABORATORY WITH SEVERAL RAW-MATERIAL MIXES. VARIOUS PARTICLE-SIZE DISTRIBUTIONS WOULD BE OBTAINED BY SELECTIVE BLENDING OF NARROW-RANGE FRACTIONS. CLINKER PREPARED FROM THOSE MATERIALS (FOR A RANGE OF BURNING TEMPERATURES) WOULD BE TESTED FOR QUALITY.

PROJECT E: STUDIES OF THE ALKALI - AGGREGATE REACTION

THE PURPOSE OF THIS PROJECT IS TO INVESTIGATE THE PARAMETERS GOVERNING CONCRETE QUALITY WITH RESPECT TO ALKALI CONTENT AND REACTIVITY OF AGGREGATE. TOPICS TO BE COVERED INCLUDE THE EXTENT AND RATE OF REACTION, THE INFLUENCE OF ALKALI CONTENT AND CHEMICAL FORM ON THE REACTION, AND THE INFLUENCE OF THE ENVIRONMENT OF THE CONCRETE STRUCTURE AND ITS DIMENSIONS ON THE EXTENT OF REACTION AND THE DEGREE OF DETERIORATION. THE POSSIBILITY OF AGGREGATE BENEFICIATION WOULD BE COMPARED WITH THE ADOPTION OF STRINGENT CEMENT SPECIFICATIONS. THE BEHAVIOR OF BLENDED POZZOLANIC CEMENTS WOULD BE INVESTIGATED FOR UNCLASSIFIED

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POSSIBLE MODIFICATION OF THE ALKALI - AGGREGATE REACTIONS.

A CONSIDERABLE AMOUNT OF PUBLISHED DATA AND DOCUMENTED EXPERIENCE ON THE ALKALI - AGGREGATE REACTION IS AVAILABLE. AFTER A LITERATURE SURVEY, THOROUGH INVESTIGATION OF CEMENT PROPERTIES AND AGGREGATE CHARACTERISTICS WILL BE REQUIRED, AND POSSIBLY NEW TEST PROCEDURES MUST BE DEVELOPED, PARTICULARLY WITH REGARD TO AGGREGATE TESTING.

PROJECT F: USE OF THE PRECALCINER AS A MEANS OF UTILIZING THE FOUR-STAGE PREHEATER IN PRODUCING LOW-ALKALI CEMENT WITH RELATIVELY HIGH-ALKALI RAW MATERIALS

THE BASIC PURPOSE OF THIS PROJECT IS TO INVESTIGATE THE MEANS OF RELEASING AND COLLECTING ALKALI SO THAT IT CAN BE REMOVED FROM THE CEMENT-MANUFACTURING SYSTEM IN THE MOST EFFICIENT MANNER.

ITEMS TO BE INVESTIGATED IN THE LABORATORY INCLUDE THE DEGREE OF ALKALI REMOVAL FROM SELECTED RAW MATERIALS AT VARIOUS TEMPERATURES AND RESIDENCE TIMES, THE POSSIBILITIES OF CHEMICAL ADDITIONS AND ALTERATION OF CLINKER PHYSICAL PROPERTIES TO FACILITATE ALKALI REMOVAL, AND MECHANICAL MEANS OF COLLECTING AND REMOVING ALKALI FROM THE SYSTEM, INCLUDING THE DEVELOPMENT OF HIGH-TEMPERATURE FILTERS OR PRECIPITATORS.

SUBSEQUENT ACTION WOULD INCLUDE A PRACTICAL EVALUATION AND DEMONSTRATION OF ENERGY SAVINGS THAT COULD BE ACCOMPLISHED BY REDUCING THE ENERGY LOSS IN BYPASS KILN GASES BY MEANS OF PRECALCINING SYSTEMS.

IN ALL THESE INVESTIGATIONS THE EFFECT ON ENERGY CONSUMPTION OF THE TOTAL PYROPROCESSING SYSTEM MUST BE EVALUATED.

PROJECT G: FIXATION OF ALKALIS IN KILN DUST
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THE PURPOSE OF THIS PROJECT IS TO PROVIDE RECOMMENDATIONS FOR REMOVING OR FIXING ALKALI SALTS FROM KILN DUST, THUS ALLOWING REUSE OF THE DUST IN THE KILN OR DIRECTLY IN CEMENT, AND ALTERNATIVE USE OF THE ALKALI IF THE SALTS CAN BE RECOVERED EFFECTIVELY.

TECHNIQUES SUCH AS WATER WASHING, CHEMICAL LEACHING, AND PYROLITIC METHODS WOULD BE INVESTIGATED WITH RESPECT TO THEIR EFFICIENCY IN ALKALI REMOVAL, THEIR EFFECTS ON THE REMAINING DUST (OR INSOLUBLE SLUDGE), AND THE EASE OF RECOVERY OF ALKALI SALTS. INVESTIGATION OF THE

INSOLUBLE DUST RESIDUE WOULD INCLUDE ITS USE IN WET-PROCESS SLURRY FEED TO KILNS AND AS A COMPONENT IN TEST CONCRETE BLENDS. THE DUST MAY ALSO PROVE ACCEPTABLE IN ROAD BUILDING (WHERE FLY ASH IS CURRENTLY USED) BECAUSE IT COMPACTS READILY.

PROJECT H: INFLUENCE OF SULFATE CONTENT ON CLINKER GRINDABILITY

THIS PROJECT IS INTENDED TO PROVIDE BASIC INFORMATION ON THE EFFECT OF CLINKER CRYSTALLINE STRUCTURE ON THE ENERGY REQUIRED TO GRIND IT AND THE ROLE PLAYED BY SULFATES. THEREFORE WORK WOULD INCLUDE EXAMINING CLINKER CRYSTALS, AS WELL AS DETERMINING SULFATE LEVELS AND

TESTING GRINDABILITY. THE PROJECT WOULD ALSO COVER THE INFLUENCE OF SULFUR IN THE KILN FUEL ON BURNABILITY AND SUBSEQUENT GRINDING OF CLINKER.

PROJECT I: SULFATE SPECIFICATIONS AS A CONSTRAINT TO GYPSUM ADDITION TO CEMENT AND POSSIBLE REPLACEMENT OF GYPSUM AS AN ADDITIVE

THE BASIC PURPOSE OF THE PROJECT IS TO PROVIDE INFORMATION
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ON THE PERMISSIBLE EXPANSION AND SHRINKAGE LIMITS FOR CEMENTS AND TO ESTABLISH APPROPRIATE GUIDELINES FOR MAXIMUM SULFATE CONTENT. IF GYPSUM IS REPLACED BY OTHER ORGANIC OR INORGANIC ADDITIVES, GUIDELINES MAY BE DEVELOPED WHICH WILL ALLOW THE USE OF HIGH-SULFUR KILN FUELS WITHOUT RISK TO CEMENT QUALITY AND SUBJECT PRIMARILY TO ENVIRONMENTAL CONSTRAINTS.

TESTS WILL BE REQUIRED TO ESTABLISH SETTING TIMES, SHRINKAGE, AND STRENGTH DEVELOPMENT OF A SERIES OF CEMENTS WITH DIFFERENT GYPSUM (AND TOTAL SULFATE) CONTENT. IN CONNECTION WITH REPLACEMENT ADDITIVES, AN INITIAL SERIES OF TESTS WITH VARIOUS ANHYDROUS ALUMINATES WILL BE PERFORMED AND THE EFFECT OF POSSIBLE ADDITIVES DETERMINED. SUBSEQUENTLY, ADDITIVES SHOWING THE GREATEST POTENTIAL FOR SUCCESS WILL BE TESTED WITH A REPRESENTATIVE SELECTION OF PORTLAND CEMENTS.

3. STEEL

A LIST OF 41 ENERGY CONSERVATION PROJECTS WERE EXAMINED WITH RESPECT TO THE FOLLOWING CRITERIA:

-- 1. POTENTIAL FOR ENERGY CONSERVATION

- 2. TECHNICAL FEASIBILITY
- 3. LEVEL OF CAPITAL INVESTMENT NEEDED TO IMPLEMENT
A CONSERVATION PROJECT
- 4. EXTENT OF R&D NEEDED FOR IMPLEMENTATION
- 5. BENEFIT/COST RATIO FOR EACH PROJECT.

AS A RESULT OF REVIEW BY INDUSTRY EXPERTS, THE FOLLOWING SIX PROJECTS (OF THE ORIGINAL 41) WERE RECOMMENDED FOR INTERNATIONAL AGENCY RESEARCH AND DEVELOPMENT PROJECTS. EACH IS HIGHLY RANKED WITH RESPECT TO ENERGY CONSTRUCTION POTENTIAL AND EACH IS JUDGED AS HAVING A HIGH BENEFIT/COST RATIO WHICH COULD SERVE AS A SIGNIFICANT INDUCEMENT

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FOR APPLICATION BY THE STEEL INDUSTRY:

ENERGY CONSERVATION MEASURE	APPLICATION AREA
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FORMED COKE	COKE OVENS & BLAST FURNACE
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USE OF SEMICOKE AND CHAR IN OF COKE BREEZE	AGGLOMERATION
---	---------------

EXTERNAL DESULFURIZATION	BLAST FURNACE
--------------------------	---------------

INJECTION OF COAL	BLAST FURNACE
DIRECT ROLLING	SEMIFINISHING
ON LINE SURFACE CONDITIONING	SEMIFINISHING

SIX ADDITIONAL PROJECTS HAVE BEEN IDENTIFIED AS HAVING A LOW BENEFIT/COST RATIO MAINLY BECAUSE OF HIGH CAPITAL INVESTMENT REQUIREMENTS. THESE PROJECTS HOWEVER HAVE A HIGH POTENTIAL FOR ENERGY CONSERVATION, AND RESEARCH AND DEVELOPMENT ACTIVITIES FOR THESE PROJECTS ARE PROPOSED SPECIFICALLY FOR THE PURPOSE OF EXAMINING ALTERNATIVE METHODS OF IMPLEMENTATION WITH CONSIDERABLY REDUCED CAPITAL REQUIREMENTS:

ENERGY CONSERVATION MEASURE	APPLICATION AREA
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DRY COKE QUENCHING	COKE OVENS
OXYGEN ENRICHEMENT	BLAST FURNACE
OXYGEN BLOWING	BLAST FURNACE
RECOVERY OF BOF GAS	LIQUID METAL STEEL- MAKING
REDUCED TEMPERATURE COKING	COKE OVENS
PARTIAL COKING	COKE OVENS

FINALLY, THE STUDY GROUP AGREED THAT AN INTERNATIONALLY-

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FUNDED "RESEARCH INSTITUTE", WITH LARGE SCALE PILOT PLANT FACILITIES, WAS A WORTHWHILE TOPIC FOR FURTHER INVESTIGATION, SINCE THE EXPENDITURES FOR APPROPRIATELY SIZED TEST FACILITIES (SUCH AS A PILOT SCALE BLAST FURNACE) MIGHT PROVE TOO GREAT FOR ANY SINGLE COUNTRY TO SUPPORT THE NECESSARY RESEARCH AND DEVELOPMENT ACTIVITIES.

4. PLASTICS

FIVE R AND D TOPICS WERE SELECTED. THESE ARE AS FOLLOWS:

1. COOPERATION BETWEEN THE STEEL AND CHEMICAL INDUSTRIES IN THE USE OF BLAST FURNACE GAS AND COKE OVEN GAS.

THE USE OF THE HYDROGEN AND CARBON MONOXIDE CONTAINED IN EFFLUENT FROM STEELMAKING PLANTS (E.G., BLAST FURNACE GAS, COKE OVEN GAS) AS CHEMICAL FEEDSTOCK. SUCH GASES ARE USUALLY BURNED IN THE STEEL PLANT TO RECOVER ONLY THEIR VALUE AS FUEL. HOWEVER, THESE GASES SHOULD BE SUITABLE FOR PRODUCTION OF AMMONIA AND/OR METHANOL. THEREFORE, THE POTENTIAL EXISTS FOR MEANINGFUL COOPERATION IN THIS AREA BETWEEN THE CHEMICAL INDUSTRY AND THE STEEL INDUSTRY.

2. THE OPTIMUM USE OF GAS TURBINES IN CHEMICAL OPERATIONS.

THE USE OF A GAS TURBINE IN A CHEMICAL PLANT TO PRODUCE ELECTRICITY, UTILIZING THE EXHAUST GASES AS COMBUSTION AIR TO CRACKING FURNACES. THESE EXHAUST GASES ARE HOT AND RICH IN OXYGEN, AND ARE THUS VERY USEFUL FOR COMBUSTION PURPOSES. THE PROPOSAL IS TO EXAMINE THE BENEFITS OF SUCH GAS TURBINE APPLICATION VIS A VIS ALTERNATIVES SUCH AS BACK PRESSURE TURBINES.

3. USE OF FUEL CELLS IN CHEMICAL OPERATIONS.

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THE OPPORTUNITY EXISTS IN MANY CHEMICAL PROCESSING PLANTS OF USING BOTH THE ELECTRICAL OUTPUT (PERFERABLY AS DC) AND THE LOW-GRADE THERMAL OUTPUT OF FUEL CELLS. ONE EXAMPLE IS THE PROCESS FOR STYRENE MANUFACTURE. RESEARCH IN THIS AREA COULD LEAD TO APPLICATION OF FUEL CELLS IN THE INDUSTRY WITH THE CORRESPONDING USE OF

ENERGY REACHING OVER 80 PERCENT EFFICIENCY.

4. USE OF COAL AS FEEDSTOCK.

THIS ITEM WAS PROPOSED IN VIEW OF THE DECREASING WORLDWIDE RESERVES OF OIL AND NATURAL GAS FORESEEN FOR THE MEDIUM-TERM FUTURE, AND THUS THE NEED FOR THE CHEMICAL INDUSTRY TO TURN TO OTHER FEEDSTOCK SOURCES SUCH AS COAL (WHICH IN FACT IS A TRADITIONAL FEEDSTOCK FOR MANY CHEMICALS AND FOR WHICH BASIC TECHNOLOGY EXISTS).

5. REDUCTION OF MERCURY LOSS IN CHLORINE/CAUSTIC PRODUCTION.

THIS PROPOSED R AND D PROGRAM DEALS WITH THE INTERFACE BETWEEN ENERGY AND ENVIRONMENT. CHLORINE IS PRODUCED ON A LARGE SCALE BY THE ELECTROLYSIS OF BRINE, FOR WHICH TWO PROCESSES ARE CURRENTLY IN USE: THE MERCURY CATHODE CELL PROCESS AND THE DIAPHRAGM CELL PROCESS. THE ELECTRIC ENERGY REQUIREMENT OF THE DIAPHRAGM CELL IS LOWER THAN THAT OF THE MERCURY CELL, BUT THE CONCENTRATION OF THE

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BYPRODUCT CAUSTIC SODA SOLUTION IS LOWER AND EXTRA ENERGY IS NEEDED TO BRING IT TO A QUALITY SUITABLE FOR THE MARKET.

THE OPERATION OF MERCURY-CATHODE CELLS RELEASED SMALL QUANTITIES OF MERCURY INTO THE ENVIRONMENT AND LEGISLATIVE ACTION RELATING TO THE LEVELS OF RELEASE WHICH
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CAN BE PERMITTED HAS CAUSED SEVERAL SUCH PLANTS TO CLOSE AND IN SOME CASES THE CHANGEOVER OF THE ENTIRE PRODUCTION CAPACITY OF A COUNTRY FROM ONE TYPE OF CELL TO THE OTHER TO BE CONSIDERED.

THE WHOLESALE CLOSURE OF MERCURY-CATHODE CELL PLANTS MAY BE AGAINST THE LONG TERM INTERESTS OF ENERGY CONSERVATION BECAUSE THE DEVELOPMENT OF A NEW CELL, THE PERMIONIC MEMBRANE CELL, WHICH OFFERS THE ADVANTAGE OF THE LOWER ELECTRICITY CONSUMPTION OF THE DIAPHRAGM CELL TOGETHER WITH THE HIGHER CAUSTIC QUALITY OF THE MERCURY CATHODE CELL, HAS NOW REACHED THE FIRST COMMERCIAL SCALE PLANT STAGE. TO CHANGE FROM MERCURY CATHODE CELLS TO DIAPHRAGM CELLS AT THIS POINT IN TIME WOULD CAUSE A DEFERMENT IN THE INTRODUCTION OF THE NEW MEMBRANE CELL BECAUSE OF THE NEED TO RECOVER THE INVESTMENT MADE IN THE OLDER TECHNOLOGY.

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FM SECSTATE WASHDC

TO AMEMBASSY LONDON

AMEMBASSY MADRID

AMEMBASSY OTTAWA

AMEMBASSY THE HAGUE

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FOLLOWING TEL SENT ACTION STOCKHOLM INFO OECD PARIS, NATO
FROM STATE 30 DEC 76:

QUOTE UNCLAS STATE 313313

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MIXES. VARIOUS PARTICLE-SIZE DISTRIBUTIONS WOULD BE
OBTAINED BY SELECTIVE BLENDING OF NARROW-RANGE FRACTIONS.
CLINKER PREPARED FROM THOSE MATERIALS (FOR A RANGE OF
BURNING TEMPERATURES) WOULD BE TESTED FOR QUALITY.

PROJECT E: STUDIES OF THE ALKALI - AGGREGATE REACTION

THE PURPOSE OF THIS PROJECT IS TO INVESTIGATE THE PARA-
METERS GOVERNING CONCRETE QUALITY WITH RESPECT TO
ALKALI CONTENT AND REACTIVITY OF AGGREGATE. TOPICS TO BE
COVERED INCLUDE THE EXTENT AND RATE OF REACTION, THE
INFLUENCE OF ALKALI CONTENT AND CHEMICAL FORM ON THE
REACTION, AND THE INFLUENCE OF THE ENVIRONMENT OF THE
CONCRETE STRUCTURE AND ITS DIMENSIONS ON THE EXTENT OF
REACTION AND THE DEGREE OF DETERIORATION. THE POSSIBILITY
OF AGGREGATE BENEFICIATION WOULD BE COMPARED WITH THE
ADOPTION OF STRINGENT CEMENT SPECIFICATIONS. THE BEHAVIOR
OF BLENDED POZZOLANIC CEMENTS WOULD BE INVESTIGATED FOR
POSSIBLE MODIFICATION OF THE ALKALI - AGGREGATE REACTIONS.

A CONSIDERABLE AMOUNT OF PUBLISHED DATA AND DOCUMENTED
EXPERIENCE ON THE ALKALI - AGGREGATE REACTION IS AVAILABLE.
UNCLASSIFIED

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AFTER A LITERATURE SURVEY, THOROUGH INVESTIGATION OF
CEMENT PROPERTIES AND AGGREGATE CHARACTERISTICS WILL BE
REQUIRED, AND POSSIBLY NEW TEST PROCEDURES MUST BE
DEVELOPED, PARTICULARLY WITH REGARD TO AGGREGATE TESTING.

PROJECT F: USE OF THE PRECALCINER AS A MEANS OF UTILIZING
THE FOUR-STAGE PREHEATER IN PRODUCING LOW-ALKALI CEMENT
WITH RELATIVELY HIGH-A

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